

REMARKS

This communication is in response to the Office Action of May 19, 2004. Claims 1-23 were rejected. Independent claims 1, 6, 7, 9, 10, 15, and 20 were amended, dependent claim 2 was amended, and claims 5, 14, and 19 were canceled.

Independent claims 1, 6, 7, 9, 10, 15, and 20 were amended to include a limitation that the compression method used for the selected piece of compressed data is signaled. Support for this amendment is found in paragraph [1162] and in original claims 5, 14, and 19, which were correspondingly canceled. Independent claims 1, 6, 7, 9, 10, 15, and 20 were amended to recite a limitation that the compressed trace data is transmitted on a trace bus. Support for this amendment is found in paragraph [1039] and in original claim 2. Applicant has also clarified that the trace data may comprise different trace data types, which is supported in paragraph [1160] of Applicant's specification. Additionally, Applicant has added a limitation to claims 1, 6, 7, 9, 10, 15, and 20 that the trace data type is signaled, which is supported by paragraph [1065].

The Examiner rejected the independent claims under 35 USC 103 as being obvious over Huang (U.S. Pat. No. 5,748,904) in view of Mann (U.S. Pat. No. 6,009,270). Huang discloses a graphics compression method using a plurality of compression modules. Mann discloses a tracing system that does not have compression modules. The Examiner agreed, on page 8 of the Office Action, that Huang is directed towards the compression of graphics data, not trace data. However, the Examiner contends that "the methods of Huang can be generalized to include all types of data" such that it renders obvious in view of Mann a tracing system having a plurality of compression modules. Applicant respectfully disagrees that Huang can be broadly generalized without taking into account the problem that Huang is directed towards and specific details regarding the data that Huang compresses and the manner that Huang stores the compressed data.

Applicant has amended claims 1, 6, 7, 9, 10, 15, and 20 to distinguish aspects of data compression that are specific to a tracing system and which cannot be properly generalized from the graphics compression system of Huang. As amended, the

independent claims include limitations corresponding to compressing trace data having a plurality of different trace data types, transmitting the compressed trace data on a trace bus, signaling the data type of the compressed trace data, and signaling the compression method used to compress the data.

Some aspects of Applicant's claimed inventions may be understood in Figure 2 of Applicant's specification. In one embodiment of a tracing system signal PDO_AD corresponds to trace data transmitted on a trace bus, signal PDO_TType corresponds to a trace data type signal, and signal PDO_TMode corresponds to a transmission mode signal used to signal the compression mode used to compress the trace data. As can be seen in the PDO_AD signal, the trace data that is transmitted on different clock cycles may correspond to PC values, load-address values, load-data, PC values, store-address values, and store-data. As further elaborated in Applicant's specification in paragraph [1160] the trace data types received by the compression modules may include a PC value, a load/store address value, a load/store data value, processor mode information, or a user defined data value.

By comparing the PDO_AD signal and the PDO-TType signal in corresponding clock cycles in Figure 2 it can be seen that the PDO_TType signal changes to indicate the type of data that is being transmitted on the trace bus, as described in paragraph [1072]. For example, whenever a PC value is transmitted, the PDO_TType signal changes to TPC to indicate that a PC value was transmitted on the trace data bus.

It can also be seen in Figure 2 that each piece of data transmitted on the trace data bus also has a transmission mode (i.e., compression mode) signal in corresponding clock cycles. The PDO_TMode signal indicates the compression technique that was used to compress the transmitted trace data, as described in paragraphs [1074-1075].

Claims 1, 6, 7, 9, 10, 15, and 20 require compression of different types of trace data and signaling the trace data type of compressed trace data. Huang does not teach or suggest these two limitations. The particular problem that Huang is directed to is efficiently compressing graphics data for storage on a host computer, as described in column 1, lines 10-41. Huang compresses only one type of data, namely pixels, as described in column 3, lines 54-55. As a result, Huang does not compress different data types and Huang also does not signal the type of data that is being compressed.

Claims 1, 6, 7, 9, 10, 15, and 20 require transmitting compressed trace data on a trace bus and also signaling the compression method that was used to compress the data. Huang does not teach or suggest these two limitations. Huang is directed towards data storage of compressed pixels in a compressed frame buffer, as described in column 1, lines 44-52. As a result, Huang utilizes a compression technique in which code words represent both the compressed data and the compression method. For example, as described in column 2, lines 9-10, "A code-word stores both the index of the compression algorithm and the compressed data." Huang also alternately describes an embodiment in which a "local header 58 becomes the code-word header of the compressed data segment" as described in column 3, lines 62-67. However, in both cases, Huang stores code words in a compressed frame buffer as units that include both the compressed data and information indicating the compression method. Consequently, Huang does not teach or suggest transmitting compressed data on a trace bus and separately signaling the compression method.

Applicant also respectfully submits that the combination of elements in claims 1, 6, 7, 9, 10, 15, and 20 produce a non-obvious result. Referring again to Figure 2 of Applicant's specification, Applicant's claimed invention is not just compressing trace data using different compression methods. Applicant's claimed inventions also describe the coordination of different signals to account for the fact that the trace data stream has variations over time in the type of trace data transmitted on the trace data bus and variations in the compression method over time, depending upon which compression method is selected to be the best compression method for a particular piece of trace data. As a result, the trace data type signal and the compression method signal are required at the receiving end to reconstruct the trace data from the compressed trace data sent on the trace bus. The cited art, Huang and Mann, do not teach or suggest such an interaction of elements.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is now in condition for allowance. The Examiner is invited to contact the undersigned if there are any residual issues that can be resolved through a telephone call.

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